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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,872	02/21/2002	Walter Callen	09010-108001	9897

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FISH & RICHARDSON, PC
4350 LA JOLLA VILLAGE DRIVE
SUITE 500
SAN DIEGO, CA 92122

EXAMINER	
PROUTY, REBECCA E	
ART UNIT	PAPER NUMBER
1652	17

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/081,872	Applicant(s) Callen et al.
	Examiner Rebecca Prouty	Art Unit 1652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jun 23, 2003* .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-120* is/are pending in the application.

4a) Of the above, claim(s) *30-46, 49-73, 93-100, and 107-120* is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-29, 47, 48, 74-92, and 101-106* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 8
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Applicant's election with traverse of Group 62 in Paper No. 10 is acknowledged. The traversal is on the ground(s) that the invention of Groups 34, 36-38, 41-43, 50-56, 58, 60-79, 81, and 83-105 should be rejoined as the coexamination of these groups and Group 62 would not be an undue burden. This is not found persuasive because the amylase of each of these groups are substantially structurally distinct such that search of the amylase of Group 62 will not necessarily lead to art applicable to the amylase of Groups 34, 36-38, 41-43, 50-56, 58, 60-79, 81, and 83-105 and vice versa. As such the search of the additional structure would constitute an undue burden.

Applicants further request rejoinder of the method claims of which recite methods of use of the amylase of Group 62. However, as the corresponding product claims are not currently allowable, rejoinder is not currently required. The applicability of rejoinder will be evaluated upon allowance of the product claims of the elected group.

The requirement is still deemed proper and is therefore made FINAL.

Claims 30-46, 49-73, 93-100 and 107-120 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or

linking claim. Applicant timely traversed the restriction requirement in Paper No. 10.

Claims 1-29, 47-48, 74-92, and 101-106 are objected to as including non-elected subject matter. Applicant should note that for purposes of examination the claims have been examined as if drawn to the elected subject matter only.

Claims 2-4, 7-15, 29, 47, 74-91, and 103-106 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-4 (upon which Claims 7-15 depend), 74 (upon which Claims 75-88 depend), 89-91 and 103 (upon which Claims 104-106 depend) are indefinite in the recitation of "high stringency" or "highly stringent conditions", "moderate stringency" or "moderately stringent conditions" or "low stringency" as the specification does not define what conditions constitute high, moderate and/or low stringency. While pages 18-19 and 46-50 of the specification describe a variety of conditions which are intended to be high, moderate and/or low stringency, there is nothing to suggest that other conditions would not also be included within the scope of this term and in the art what is considered high, moderate and/or low stringency varies widely depending on the individual situation as well as the person

making the determination. As such it is unclear how homologous to the sequence of a gene of SEQ ID NO:125, a sequence must be to be included within the scope of these claims.

Claims 29 and 47 are confusing in the recitation "sequences complementary to SEQ ID NOS: 2, 4, 6, etc." and "sequences complementary to variants having at least about 50% homology to SEQ ID NOS: 2, 4, 6, etc." as SEQ ID NOS: 2, 4, 6...etc. are protein sequences. There is no such thing as the complement of a protein sequence. As such these phrases have not been further examined and the Markush Group of Claims 29 and 47 has been assumed to include amino acid sequences of SEQ ID NOS 2, 4, 6, 10 ... 298, variants having at least 50% homology to one of SEQ ID NOS 2, 4, 6, 10 ... 298 over a region of at least 100 amino acids and polypeptides having at least 10 consecutive amino acids of a polypeptide of SEQ ID NOS 2, 4, 6, 10 ... 298.

Claim 104 is confusing in the recitation of "a fosmid" in the recited Markush group is not understood as it is unclear whether this is a known type of vector and if so what it is.

Claim 106 is confusing in the recitation of "host cell as claimed in claim 47, 102, 103, or 105" as Claims 47, 102, and 103 do not claim host cells.

Claim 106 is confusing in the recitation of "metabolically rich hosts" as it is unclear by what standard one determines if a

host is "metabolically rich" and therefore what scope of host is included in this phrase.

Claims 1-5, 16-29, 47-48, 74-92 and 101-106 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1-5, 16-29, 47-48, 74-92 and 101-106 are directed to polynucleotides encoding an alpha amylase and having at least 50% sequence identity to 100 nucleotides of SEQ ID NO:125, or a complement thereof, or which hybridizes thereto under low medium or high stringency conditions (Claims 1-5, and 16), polynucleotides comprising at least 10 bases of a sequence having 50%-100% identity to SEQ ID NO:125 (Claims 17-28 and 74-91), or polynucleotides comprising fragments of SEQ ID NO:125 (Claim 92) or encoding fragments of SEQ ID NO:126 (Claim 29) or vectors and host cells comprising said nucleic acids (Claims 101-106) or methods of expressing said nucleic acids (Claims 47 and 48). Claims 1-5, 16-29, 47-48, 74-92 and 101-106 are rejected under this section of 35 USC 112 because the claims are directed to a genus of polynucleotides and variants and fragments thereof that have not been disclosed in the specification. No description has

been provided of the structure and function of the modified polynucleotide sequences encompassed by the claims. No information, beyond the characterization of SEQ ID NO:125 which encodes the amylase of SEQ ID NO:126 has been provided by applicants which would indicate that they had possession of the claimed genus of modified polynucleotides. The specification does not contain any disclosure of the structure and function of all the polynucleotide sequences derived from SEQ ID NO:125, including fragments and variants within the scope of the claimed genera. The genera of polynucleotides claimed is a large variable genus including polynucleotides which can have a wide variety of structures and functions. It should be noted that even within Claim 1 which is limited to polynucleotides encoding polypeptides with amylase activity there are a wide variety of structures encompassed as the structural limitations recited require similarity to only 100 nucleotides of a 1395 residue sequence. Therefore many structurally unrelated polynucleotides are encompassed within the scope of these claims. The specification discloses only a small number of species of the claimed genus which is insufficient to put one of skill in the art in possession of the attributes and features of all species within the claimed genus. Therefore, one skilled in the art

cannot reasonably conclude that applicant had possession of the claimed invention at the time the instant application was filed.

Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claims 1-29, 47-48, 74-92, and 101-106 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for polynucleotides encoding SEQ ID NO:126, does not reasonably provide enablement for any polynucleotide having at least 50% sequence identity to SEQ ID NO:125 and encoding a polypeptide with an amylase activity or any polynucleotide comprising at least 10 bases of a sequence having 50% identity to SEQ ID NO:125, or any polynucleotide comprising a fragment of SEQ ID NO:125 or encoding fragments of SEQ ID NO:126, or all fragments and variants thereof or vectors and host cells comprising said nucleic acids. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Claims 1-29, 47-48, 74-92, and 101-106 are directed to polynucleotides having at least 50%-95% sequence identity to SEQ ID NO:125 and encoding a polypeptide with an amylase activity

(Claims 1-16), polynucleotides comprising at least 10 bases of a sequence having 50% identity to SEQ ID NO:125 (Claims 17-28 and 74-91), or polynucleotides comprising fragments of SEQ ID NO:125 (Claim 92) or encoding fragments of SEQ ID NO:126 (Claim 29) or vectors and host cells comprising said nucleic acids (Claims 101-106) or methods of expressing said nucleic acids (Claims 47 and 48). The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polynucleotides encoding amylases and variants and fragments thereof broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the polynucleotide of SEQ ID NO:125 which encodes the esterase of SEQ ID NOS 126.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or

multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass an enormous number of polynucleotide fragments and variants of the polynucleotide of SEQ ID NO:125 because the specification does **not** establish: (A) regions of the protein structure which may be modified without effecting amylase activity; (B) the general tolerance of amylases to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residues with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the

claimed invention in a manner reasonably correlated with the scope of the claims broadly including an enormous number of polynucleotide fragments and variants of the polynucleotide of SEQ ID NO:125. The scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of polynucleotides having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-12, 16-29, 47, 48, 74-86, 89-92 and 101-106 are rejected under 35 U.S.C. 102(b) as being anticipated by Tachibana et al. (Reference AK of applicant's IDS).

Tachibana et al. teach the isolation and expression of a polynucleotide encoding *Pyrococcus* sp. KOD1 alpha amylase. This polynucleotide has 80% identity to SEQ ID NO:125, encodes a protein with 85% identity to SEQ ID NO:126 and comprises a region

of 32 consecutive nucleotides with 100% identity to a region of SEQ ID NO:125 (i.e., nucleotide 1193-1224 of Tachibana et al. are identical to residues 748-779 of SEQ ID NO:125) as well as a region encoding 68 consecutive amino acids of SEQ ID NO:126 (i.e., amino acids 294-361 of Tachibana are identical to residues 292-359 of SEQ ID NO:126). This polynucleotide anticipates all of the instant claims.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 87 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachibana et al. (Reference AK)

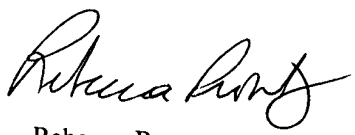
Tachibana et al. is discussed above. The nucleic acid of Tachibana et al. differs from those of the instant claims only in that the nucleic acids of the claims include a detectable label.

As the identification of other amylase genes would be desirable, it would have been obvious to one of ordinary skill in the art to label the nucleic acid of Tachibana et al. in order to use this nucleic acid as a probe for related amylase genes of other organisms. Use of any of the many well known types of labeling compounds (radioisotopes, fluorescent compounds, chemiluminescent compounds, enzymes such as horse radish peroxidase or alkaline phosphatase, etc. or haptens) would have been obvious to one of skill in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca Prouty, Ph.D. whose telephone number is (703) 308-4000. The examiner can normally be reached on Monday-Friday from 8:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy, can be reached at (703) 308-3804. The fax phone number for this Group is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.



Rebecca Prouty
Primary Examiner
Art Unit 1652